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L10: Entry 1 of 1

File: USPT

Sep 11, 2001

US-PAT-NO: 6289360

DOCUMENT-IDENTIFIER: US 6289360 B1

TITLE: Method and system for eliminating synchronization between sweep and allocate in a concurrent garbage collector

DATE-ISSUED: September 11, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Lewis; Ethan	Haifa			IL

US-CL-CURRENT: 707/206; 707/200

Full	Title	Citation	Front	Review	Classification	Date	Reference	USPTO	USPTO	Claims	KMCD	Draw D
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L10: Entry 1 of 1

File: USPT

Sep 11, 2001

DOCUMENT-IDENTIFIER: US 6289360 B1

TITLE: Method and system for eliminating synchronization between sweep and allocate in a concurrent garbage collector

Brief Summary Text (4):

Many of the prior art techniques mentioned in the next section are discussed in greater detail in the following publications:

Brief Summary Text (12):

Within the context of computer memory management, garbage collection relates to the automatic reclamation of computer storage. When data objects such as arrays, records and other data structures are created, space for the object is allocated in the heap. The term "object" is used herein to denote generally any piece of memory. When the object is no longer needed, its space must be freed in order that the heap does not become saturated with objects that are no longer required for the computation. Computer programming languages such as Pascal or C, typically require the programmer to attend to reclamation of heap storage manually. The programmer must keep track of information that allows him to determine when an object can be safely discarded. This manual heap maintenance is feasible, although prone to errors.

Issued US Original Classification (1):707/206Current US Original Classification (1):707/206US Reference US Original Classification (1):707/206US Reference US Original Classification (2):707/206US Reference US Original Classification (3):707/206US Reference US Original Classification (4):707/206US Reference US Original Classification (5):707/206US Reference US Original Classification (6):707/206US Reference Group (1):5761670 19980600 Joy 707/206

US Reference Group (2):5819299 19981000 Bejar 707/206US Reference Group (3):5848423 19981200 Ebrahim et al. 707/206US Reference Group (4):5930807 19990600 Ebrahim et al. 707/206US Reference Group (5):5991779 20000400 Bejar 707/206US Reference Group (6):6052699 20000400 Huelsbergen et al. 707/206

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L22: Entry 11 of 26

File: USPT

Mar 4, 2003

US-PAT-NO: 6530008

DOCUMENT-IDENTIFIER: US 6530008 B1

TITLE: Method for managing a database for storing variable size data records using fixed size buckets

DATE-ISSUED: March 4, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lin; Sheng Ling	Lisle	IL		
Li; Hongguang	Lisle	IL		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
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APPL-NO: 09/ 450356 [PALM]

DATE FILED: November 29, 1999

INT-CL: [07] G06 F 12/00US-CL-ISSUED: 711/171; 707/101, 707/200US-CL-CURRENT: 711/171; 707/101, 707/200

FIELD-OF-SEARCH: 707/1-206, 711/170-173

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected**Search ALL****Clear**

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>5440732</u>	August 1995	Lomet et al.	707/1
<input type="checkbox"/>	<u>5517632</u>	May 1996	Matsumoto et al.	395/441
<input type="checkbox"/>	<u>5542087</u>	July 1996	Neimat et al.	395/600
<input type="checkbox"/>	<u>5630119</u>	May 1997	Aristides et al.	348/906
<input type="checkbox"/>	<u>5757900</u>	May 1998	Nagel et al.	379/219
<input type="checkbox"/>	<u>5893086</u>	April 1999	Schmuck et al.	707/1
<input type="checkbox"/>	<u>5960431</u>	September 1999	Choy	707/7

<input type="checkbox"/>	<u>5963937</u>	October 1999	Yamasaki et al.	707/201
<input type="checkbox"/>	<u>6067547</u>	May 2000	Douceur	707/100
<input type="checkbox"/>	<u>6115705</u>	September 2000	Larson	707/3
<input type="checkbox"/>	<u>6173415</u>	January 2001	Litwin et al.	711/114

ART-UNIT: 2177

PRIMARY-EXAMINER: Breene; John

ASSISTANT-EXAMINER: Wong; Leslie

ABSTRACT:

The present invention provides an improved method for managing a toll-free number database within a storage medium. The method provides for extending space for record data within the storage medium. Memory space within the storage medium is allocated into buckets for storing records in accord with record size. A database-index is provided for mapping each record to a bucket. A bucket-index is provided for identifying buckets that may receive new records. If a bucket becomes full or approaches full occupancy, a new bucket is added to the database and the bucket-index is updated accordingly. An occupancy-index may be provided for indicating the amount of available memory in each bucket.

10 Claims, 5 Drawing figures

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L18: Entry 5 of 7

File: USPT

Jul 10, 2001

DOCUMENT-IDENTIFIER: US 6260049 B1

TITLE: Automated shelf management system and process for tracking and purging file folders in a file storage facility

Abstract Text (1):

An automated system and process for managing paper files, particularly medical records contained in file folders and the like, in a file storage system having a predetermined size or limited expansion capacity. A shelf manager system includes a computer program and database which tracks the thickness of individual file folders, the capacity of storage shelf sections, and the percentage of free space remaining in each shelf section. The thickness of each file folder is measured whenever the file folder enters or leaves the primary file storage facility. File folder thickness is computed by weighing the file on an electronic scale or other caliper-based measure device. When occupied shelf space exceeds a threshold percentage for a shelf section, file folders are purged according to the likelihood that certain files will not be requested in the future by applying purging algorithms to the individual files. In an alternative embodiment, document image scanning provides multiple copies of pertinent file information to fulfill multiple pending file requests. In another alternative embodiment, the file folders include radio frequency identification tags for passive detection of file folder identification. In a still further alternative embodiment, data from the shelf manager system controls a digital printing press to create direct print color-coded file folders for use with the shelf manager system.

Brief Summary Text (4):

In office environments, although there is a trend toward the paperless office, where files will exist primarily in electronic form, there is continued reliance on paper files and paper file folders, which are generally stored on open shelving units or in filing cabinet drawers. In some environments, such as health care, legal, insurance, and corporate, the number of files and the contents of those files can quickly grow to exceed the capacity of most file systems and the space available for file storage.

Brief Summary Text (5):

The problems of storage and tracking of individual files have generally been addressed by improving the physical storage shelving to make it more compact or to provide some automatic means of file retrieval. For example, U.S. Pat. No. 4,219,296 discloses an automatic file storage and retrieval apparatus, in which a movable carriage locates and pulls out individual files stored on coded shelving. Although systems like the one described are basically effective, they are expensive and they have a limited capacity. Also, file folders which are inactive and not likely to be needed take up valuable file storage space.

Brief Summary Text (6):

Some large businesses have addressed their growing file storage needs by allocating greater space within their buildings to the file storage function, and even constructing additional buildings for file storage; however this is generally an expensive solution, requiring high construction costs as well as operating and staffing costs.

Brief Summary Text (9):

Another common drawback of conventional filing systems is file section overflow, in which individual filing sections may become overfilled. This results from some file sections filling at a faster rate than other file sections due to an increase in the number of files or an increase in the thickness of individual files due to added content. In these situations, in order to make adequate room for new files within overfilled file sections, a manual process known as back shifting is performed, in which the file contents for several shelf sections are redistributed to make more room in the overfilled sections. Back shifting is a time-consuming, tedious process, which can cause delays in normal filing operations during the time the back shifting is carried out.

Brief Summary Text (13):

A solution to the problems of prior file storage systems is provided by the present invention, which optimizes the use of available file space by seeking to keep the shelves full or at a predetermined percentage of being full, such as 90-95 percent full, while avoiding the problems associated with overfilled files and back shifting.

Brief Summary Text (14):

Accordingly, it is an object of the present invention to provide a computerized file tracking and purging system which seeks to keep most file sections in a file storage facility nearly full but never overflowing.

Brief Summary Text (16):

It is yet another object of the present invention to provide a computerized file tracking and purging system which determines for each file section, hierarchically, which files are most likely to be requested and which files are least likely to be requested.

Brief Summary Text (18):

The shelf manager system of the present invention is used advantageously with the filing method known as terminal digit filing, in which a file room or file storage facility is divided in an basically equal number of sections. In the present invention, each file folder is assigned a unique file identifier, which links it to the section in which it will be stored.

Brief Summary Text (19):

The shelf manager system of the present invention includes a computer and a database coupled to the computer for storing sets of data for each file folder, which are linked by means of the file folder's unique identifier. The kinds of information stored in the database for each file folder include, as a minimum, the identifier, the physical thickness of the file folder, and the storage section to which the file folder is assigned. In addition to this information, the file database includes various information related to the file folder's content. In the case of a medical file folder, for example, the content information will advantageously include the patient's visit history, disease history, and other information.

Brief Summary Text (20):

Whenever a file folder enters or leaves the file room or file storage facility it is logged-in or logged out through a logging station, which is coupled to the computer. The logging station has the primary purpose of updating the thickness measurement for the file folder. The thickness is determined by measuring the file folder's weight, ideally on an electronic scale, although it is contemplated that the measurement could also be determined by physical measurement with an electronic caliper. The weight measurement is converted by the computer to an updated thickness measurement by applying an algorithm that relates weight to thickness. At the same time, the total file thickness for that file's assigned shelf section is recalculated and compared to a user chosen threshold value, usually in the range of

90 to 95 percent. Information related to the file folder's content is also updated in the computer database, such as patient appointment history

Brief Summary Text (21):

If the total thickness for all file folders within a storage section exceeds the set threshold percentage of the available storage space for the storage section, the purging subroutine is initiated. A set of computer algorithms apply file-usage criteria to each file within that file section to identify some folders for purging within that section. The folders for purging are added to a purge list, which may be printed out to be used as a guide by personnel performing the actual physical purging, usually during the night. The purged files are removed for shipment to off site storage. The purging subroutine identifies just the file folders needed to reduce the total thickness for all file folders below the threshold percentage for that section.

Brief Summary Text (22):

For the current shelf section, the file folders are purged according to the likelihood that certain files will not be requested in the future by applying purging algorithms to the individual files. The purging proceeds in two stages. In the first stage, file folders are purged based on a set of predetermined criteria, such as previous visit history, zip code, disease code, type of exam, and other factors that would be predictive of whether that particular folder would not be requested again. In the second stage, file folders are ranked by the date of last visit.

Drawing Description Text (24):

FIG. 22 illustrates the graphical user interface screen for the shelf space subroutine of the present invention;

Drawing Description Text (25):

FIG. 23 is a flowchart of the shelf space subroutine of the present invention;

Detailed Description Text (5):

This is accomplished by tracking paper growth in the active file storage 18 by continuously calculating the total thickness of paper sheets added or subtracted from the file system as a whole, and particularly within file storage sections, as will be described, and producing a purge list whenever a predefined threshold is exceeded. The purge list is used for removing certain low activity files from the active file storage 18 reduce the total thickness below the threshold. Based on the principles of operation of the present invention, the efficiency of the file storage system is increased because the files that are most likely to be requested are the same files that are most likely to be resident in active file storage 18, and files that are less likely to be requested are moved either to semi-active storage 20, or in off-site storage 22. The present invention also ensures that most of the available file space in the active file storage 18 will be almost fully utilized. In addition, the shelf manager system 10 of the present invention prioritizes and handles pending requests and provides reporting functions.

Detailed Description Text (9):

In addition, the medical center 12 typically includes a computer mainframe 40, which stores data related to individual patients in a medical records database 42. The kinds of information tracked for individual patients may include: name, address, visit history, disease & treatment codes, insurance, and billing information. The computer mainframe 40 may be physically located within the medical center 12 or at a separate or distant location. If at a separate location, the computer mainframe 40 would be accessible to designated hospital personnel in the medical center 12 by means of conventional local area network (LAN) or wide area networking (WAN) technology.

Detailed Description Text (10):

Although medical records computers, such as the computer mainframe 40, store an increasing quantity of patient data, the primary patient files are in paper form. Over time, the trend will be toward increased storage of patient records in electronic form, but reliance on paper records will continue well into the future.

Detailed Description Text (11):

In FIG. 1, it can be seen that the medical records storage facility 12 includes an active file storage 18 for storing in-file records 44, and a semi-active file storage 20. The active file storage 18 is generally in the form of static shelving which will be described in more detail in connection with FIG. 2. The active file storage 18 has to be sufficiently large to provide storage space for the majority of files which may be requested by the patient medical care facility 14. For a large metropolitan hospital, the number of files in active storage may number more than 400,000, partly because patient files are rarely destroyed and the patient files may go back several decades. It is important for the active storage 18 to be in close proximity to the patient medical care facility 14, so that patent records as required by the various medical departments are conveniently accessible to the doctors, laboratories, and administrative personnel in the patient medical care facility 14 as needed, without undue delay.

Detailed Description Text (12):

The difficulty of maintaining a large active storage 18 is readily apparent. As total file volume grows, the conventional solution has been to physically add additional space and personnel to cope with the increased volume. New medical records storage facilities are acquired in the form of additional buildings and support staffs to handle the need for increased storage space. The shelf manager 10 eliminates the need for providing additional active file storage 18 by efficiently utilizing the existing space, specifically by keeping the active file storage 18 as full as possible only with those files that are most likely to be requested by the patient medical care facility 14. The remaining files may safely be moved to the semi-active storage 20, where the files are stored on less-accessible mobile shelving units, which provide an increased storage density, and finally to low cost off-site storage.

Detailed Description Text (13):

Referring now to FIG. 2 and FIG. 3, the organization of the active file storage 18 is shown in more detail. For the purposes of the present discussion, the active file storage 18 is advantageously localized to a single file room. However, the principles of the present invention are application to file storage configurations of all types without limitation. The file room includes several steel shelf units 46, organized and arranged in an optimal manner to form aisles, to maximize the use of available space. Each shelf unit 46 includes a plurality of shelf levels 48 and shelf sections 50. Shelves of this type are typically eight feet high and accommodate six to ten shelf levels. Also, each shelf section has a typical length dimension in the range of 30 inches to 48 inches. The shelf unit shown in FIG. 2 can therefore be considered exemplary. The shelf manager system 10 tracks the fullness of each shelf independently, so there is no need to have all the shelf units be uniform in height or length.

Detailed Description Text (14):

The file folders 52 stand freely on the shelf and preferably fill a shelf section most efficiently from left to right, rather than being stacked from bottom to top, although the present invention is not limited to the method the shelves are filled.

Detailed Description Text (15):

The shelf arrangement may include vertical file supports or vertical file guides 53 utilized to provide support to the file folders in sections which are less than full or to otherwise subdivide a shelf section, as will be described in what follows.

Detailed Description Text (16):

In the preferred embodiment of the present invention, the file room is subdivided into a number of subsections, and the subsections are advantageously designated by unique numbers or other indicia. Also, it is not required for the subsections to be the same width as shelf sections. In FIG. 2, the shelf subsection 54 which shows the identifying number "20" is smaller than one shelf section width, while the shelf subsection 56, 58 which shows the identifying number "21" is larger than a section width. As a third example, the subsection 60, which shows the identifying number "28" is exactly equal to a subsection width. FIG. 2 also illustrates that shelf subsections need not be constant in width. Over time, some subsections will expand and some sections will contract, because the thickness of individual file folders will vary.

Detailed Description Text (17):

In contrast, FIG. 3 shows an alternative shelf arrangement in which the subsections are equal in width to the shelf sections. In both shelf arrangements shown in FIG. 2 and FIG. 3, each subsection has a unique identifier, allowing the subsection to be tracked independently of the other shelf subsections. Also, each shelf subsection may advantageously be bar coded so that its location may be tracked by the shelf manager system 10.

Detailed Description Text (20):

Terminal digit filing seeks to distribute the file folders 52 evenly in the total space available in the active file storage 18. Under this system, the active file storage 18 is divided, initially, into 10,000 even sections. The first division of the file space consists of 100 main sections representing the last two digits, 00 to 99, of a sequentially-issued number series of indeterminate length. These last two numbers are called the terminal digits (TD). For example, in the number 123-45-67, the terminal digits are "67." The "6" is the first terminal digit, representing ten percent of the total available file space; it is usually signified by the middle position color band on a side tab folder with three positions of color bands, manufactured for open shelf filing. The color coding of file folder 52 will be described in more detail in what follows and further on with reference to FIG. 4. The "7" is the second terminal digit, representing one percent of the total available file space; it is usually signified by the bottom position color band on a side tab folder with three positions of color bands, manufactured for open shelf filing.

Detailed Description Text (21):

The 100 terminal digit sections, 00 to 99, are each divided into 100 subsections, each subsection designated by two digits, 00 to 99, called the middle digits (MD). In the example 123-45-67, the middle digits are "45." The "4" is the first middle digit, representing 0.1 percent of the available file space; it is usually signified by the top position color band on a side tab folder with three positions of color bands manufactured for open shelf filing. The "5" is the second middle digit, representing 0.01 percent of the available file space. Unless the active file storage 18 is unusually large, designed to accommodate several hundred thousand to a million or more file folders 52, it will not usually be necessary to add a fourth color band to represent second middle digit.

Detailed Description Text (22):

The first three digits, "123" in the example number 123-45-67, are called the tertiary digits and are filed in sequential order after the file folder 52 is placed in terminal digit and middle digit order. If all the numbers in a series of 1,234,567 numbers were in the same file space, the tertiary digits in this example would designate the 123.sup.rd folder filed in sequential order in the "45" middle-digit subsection of the "67" terminal-digit section.

Detailed Description Text (23):

Terminal digit filing uses color-coding to identify files belonging to the same section or subsection. Using terminal digit filing, it is almost impossible to misfile a file folder, because of the color bands associated with each file. If a file folder 52 is misfiled, it will attract attention because of its different color-band pattern compared with the other file folders 52 for that subsection. Using color coding to represent both of the terminal digits and the first of the middle digits of a sequentially issued number reduces the area of a possible misfile to 0.1 percent of the total active file storage 18. An active file storage 18 containing 150,000 folders would have 150 file folders 52 in each middle digit section with the same color bands. In the present example, terminal digit 7 is represented by the color brown in the bottom band; terminal digit 6 is represented by the color yellow in the middle band; and middle digit 4 is represented by the color purple on the top band. Typically, these 150 file folders 52 would fit on a single shelf, and any misfiles would be limited to this area or would show up as a clash of color in another section.

Detailed Description Text (27):

The rear cover 66 includes a tab portion 70 for indexing the files. The tab 70 of the rear cover 66 extends beyond the edge of the front cover, so that, when the file folder 52 is in-file in the shelf unit 46 shown in FIG. 2, the tab 70 will be visible at a glance or from a distance. The tab 70 includes a patient number block 72 and the terminal digit number 74, which indicates the section wherein the file folder 52 is to be filed. The individual digits of the terminal digit filing system 74 are included on small color-coded squares 76, 77, 78, wherein specific digits correspond to specific colors, as previously described. In FIG. 4, the digits "467" represent the terminal digits "67" and the first middle digit "4." A file folder 52 with this designation will be properly filed in section "67" of the 100 sections of the file room and in subsection "4" within that section. The color-coding is visible from a distance, so that it is immediately apparent that the file folder 52 has been correctly filed with respect to the other file folders 52 having the same terminal digits, as discussed above. As part of the present invention, during manufacture of the file folder 52, the patient name, terminal digit numbers and color-coded squares may be provided by means of direct printing on the substrate 63 of the file folder from a digital color press of the type manufactured by Indigo N.V. of Maastricht, The Netherlands, which utilizes liquid toner for high speed color printing. This embodiment of the present invention will be described in more detail further on.

Detailed Description Text (29):

The file has an associated thickness measurement 84, which indicates how much file space a file takes up on a shelf, and this measurement is used by the shelf manager system 10 to create a file purge list. The file content 68 consists essentially of single sheets of paper, which have an average thickness of 0.01 inches. The thickness 84 of the file folder 52 has been found to average approximately 200 pages per inch, including the thicker front cover 64 and rear cover 66 with the tab 70. It is within the scope of the present invention to provide measurements of the thickness 84 of file folders directly by means of an electronic caliper or the like.

Detailed Description Text (34):

Computer input is provided by a conventional keyboard 92 connected to the data bus 98 through a keyboard interface 109, and also provided by a conventional mouse 110 connected to the data bus 98 through a serial/mouse port 112. The keyboard includes a plurality of alphanumeric keys 114 and may also include a dedicated numeric keypad 116. The mouse 110 includes at least one button-type switch 118 operated by a user of the system. A cursor is displayed on the screen 91 and its position is controllable via the mouse 110 or the keyboard 92, as is well known. Herein, the terms "click" and "clicked upon" are used to describe the situation in which a cursor is positioned over a screen object and the mouse button 118 or one of the keyboard keys 114 is pressed and, in some implementations, then released. The

computer 88 also includes a peripheral input interface 120 for connecting additional input devices as will be described below.

Detailed Description Text (39):

The shelf manager system 10 is a file management tool particularized for managing medical file folders and incorporates a relational database 126 to perform this function. In the preferred embodiment, this relational database was developed utilizing Foxpro, created by Microsoft Corporation. Foxpro is an object-oriented data development system which provides tools for developing relational databases management systems and applications, which have the capability of organizing information into tables, editing that information, running queries, and running reports. The Foxpro product operates within the Microsoft Windows and DOS operating system environment and utilizes such features as pop-up dialogue boxes, which gives the user a choice of entering or modifying program parameters at key points while operating the database application. It is contemplated that other relational databases may also effectively be used to implement the principles of the present invention. Also, Visual Basic also available from Microsoft, is utilized for interfacing to an electronic scale and bar-code scanner, which is described in what follows.

Detailed Description Text (52):

The shelf space subroutine 164 calls the subroutine SHFW 166, which displays statistics of all shelf space, including shelf size, inches used, and locations. It allows the user to edit existing data and enter new information about shelf spaces and locations. The shelf space function is described with more particularity in connection with FIGS. 22-23.

Detailed Description Text (68):

The subroutine next determines in step 248 if the folder has been logged or not. If the folder has not been logged, a determination is made if there has been an auto logout in step 250. If yes, the system automatically creates a logout 251. If no, the user is prompted to enter logout information in step 252. If the information has not been properly entered in step 254, the program exits in step 256. If the folder was logged in step 248 or if the information has been entered in response to the prompt, the shelf space field of the record is updated in step 258.

Detailed Description Text (70):

The next part of the subroutine directly concerns the weighing of the file folder 52 on the electronic scale 130 and the determination of the folder's size. First, in step 268, it is determined if the scale 130 is in use, indicating that the file folder 52 is present. If the scale 130 is in use, the weight is read in step 270. In step 272, a determination is made whether the weight measurement is valid or whether an error occurred. If there was a weight error, an error message is displayed in step 274 and the program exits in step 276. If there is no weight error, the size of the file folder 52 is calculated in step 278. The screen and record are then updated with the next login data in step 280. If the scale 130 was not in use in step 268, the program proceeds directly to the update step 280.

Detailed Description Text (77):

Initially, when an active file storage facility 18 is being set up for the first time to utilize the shelf manager system 10 of the present invention, an initial audit of the entire facility 18 will normally be conducted. During this audit, each shelf section will be measured. The total occupied inches of files for each section will also be measured for each middle digit section (1000 total), according the terminal digit filing system discussed above. Thus, for each middle digit section, an occupied percentage of physical inches available will be initially established and mapped to the database of the shelf manager system 10. This is a required first step.

Detailed Description Text (78):

FIG. 13 is a generalized view of the file folder purging process as it occurs after the initial audit. Whenever a file folder 52 is logged-in via a logging station 128 in step 338, it is weighed and its thickness determined. The shelf manager system 10 then determines in step 340 if the threshold percentage for the file folder's subsection has been exceeded by the newly measured thickness for the file folder 52. This determination will be made by comparing the total file inches of all file folders in the subsection, including the newly logged-in file folder 52, to the available inches in the shelf subsection, and determining if the percentage full exceeds a threshold percentage, generally 90 to 95 percent, which can be set by the user. If the threshold has been exceeded for that folder's section, shelf manager 10 automatically invokes the purge subroutine in step 342.

Detailed Description Text (79):

Once the purge subroutine has been invoked, the purge process proceeds in two stages. In the first stage, step 344, purging algorithms are applied to all files in a section to identify certain "special files" which are automatically added to the purge list. These special files are identified according to criteria which establishes a low probability that the file will be requested in the future. Certain special criteria are based on patterns in the patient's visit history, including the following:

Detailed Description Text (92):

In the second stage, in step 346, a determination is made whether additional purging is required to bring the subsection percentage below the threshold value. If additional files need to be purged, all the remaining files in a shelf subsection 54 are ranked in step 348 in order of the last time each was requested. The assumption is that the longer a file remains in active file storage 18, the higher the probability that it will be requested in the future. In step 350, files are added in reverse rank order to the purge list, with the program recalculating the subsection percentage as each file is added to the list, until the subsection percentage is below the threshold setting for that subsection.

Detailed Description Text (94):

It is contemplated that in some instances, a file purge could be conducted for all the sections in the file storage facility 16, at the same time or in succession. For example, if the user changed the threshold percentage from a higher to a lower number, (for example from 95 percent to 90 percent), to provide more space in all the shelf sections, the purge subroutine could be run for all shelf sections.

Detailed Description Text (97):

If all the identified files have been added to the purge list, and the threshold is still exceeded, the program proceeds to step 386, where the files are ranked in the order of the date last requested. In step 388, the inches for the lowest ranking file are retrieved. The identifier for the lowest ranking file is added to the purge list in step 390. In step 392, the percentage of shelf subsection inches used is recalculated and a determination is made in step 394 if the percentage still exceeds the threshold for that subsection. If it does, the program loops back and purges the next lowest ranking file. This procedure continues until the shelf subsection percentage is below the threshold value; if the percentage does not exceed the threshold, the program goes to step 360 for the next shelf subsection.

Detailed Description Text (113):

Referring to FIGS. 22 through 23, the Shelf Space user screens and flowchart are shown. The shelf space screen provides information on shelves including shelf size, shelf location, inches used, and percent used. In step 474, shelf space subroutine SHFW is initiated, causing the shelf space screen to be displayed in step 476. In step 478, the user may choose to add information to the shelf file is prompted to do so in step 480. When all needed data has been entered, in step 482, the program returns to step 476, or if the information is not entered, an error message will be displayed in step 484. In step 486, the user may choose to search for a shelf entry

and is prompted to enter search criteria in step 488. If the data is found it is displayed in step 490. If it is not found, a "Not Found" message is displayed in step 492. The user may also choose to delete a shelf file entry in step 494 and carry out the deletion in step 496.

Detailed Description Text (116):

FIGS. 28 and 29 shows the user screen and flowchart for the Audit System subroutine AUDW. In step 542, the audit system subroutine is initiated, causing an audit of the entire database 126, in which certain types of data errors are identified, such as blank and incorrect records and various data mismatches. A screen prompt 544 presents a summary of the audit results. By clicking on a screen prompt, the audit details will be displayed on the screen 91. The user will then have the choice in step 546 of printing out the audit details in step 548 or exiting in step 550.

Detailed Description Text (123):

FIG. 41 shows a graphical user interface screen 670 for use with the present invention, which allows the user to search for or to add file data associated with x-ray film jackets. The screen 670 displays log-in and log-out data for various x-ray jacket types, which may have different jacket thicknesses when empty. The screen 670 is divided into a plurality of functional sections. The inquiry section 672 allows the user to display pending and purge lists, the master patient index, and the log-in and log-outs. The add to or edit section 674 allows the user to enter or edit pending and purge lists as well as the master patient index. The print pull list section 676 allows the user to print out a pull list or display it on the monitor screen 91. The maintenance section 678 allows the user to print routing slips as well as perform maintenance operations associated with the electronic scale 130 and the label printer 132.

CLAIMS:

1. A method for managing file folders in a file storage facility having a plurality of storage sections, comprising the steps:

assigning a unique file identifier to each file folder in the file storage facility;

tracking on a computer the physical thickness, storage section location, and content information for each file folder, according to its file identifier;

updating the physical thickness, storage section location, and content information whenever the information changes;

determining, for each storage section, when the total thickness for all file folders within a file section exceeds a threshold percentage of the available storage space for the storage section; and

in response to the determination of the threshold being exceeded for a section, purging selected file folders within the section to reduce the total thickness for all file folders below the threshold percentage.

2. A system for managing file folders in file storage facility having a plurality of storage sections, comprising:

a unique file identifier associated with each file folder in the file storage facility;

a computer;

a database, coupled to the computer, for storing sets of data for each file folder representing its file identifier, physical thickness, storage section location, and

content information for each file folder, according to;

updating means for updating the physical thickness, storage section location, and content information whenever the information changes;

means for determining, for each storage section, whenever the total thickness for all file folders within a storage section exceeds a threshold percentage of the available storage space for the storage section; and

purging means, responsive to the determination that the threshold percentage is being exceeded for a section, for purging at least some file folders within the section;

wherein the purging reduces the total thickness for all file folders below the threshold percentage.

3. A system for managing file folders in a file storage facility having a plurality of storage sections, comprising:

a unique file identifier associated with each file folder in the file storage facility;

a computer;

a database, coupled to the computer, for storing sets of data for each file folder representing its file identifier, physical thickness, storage section location, and content information for each file folder, according to its file identifier;

updating means for updating the physical thickness, storage section location, and content information whenever the information changes;

means for determining, for each storage section, whenever the total thickness for all file folders within a storage section exceeds a threshold percentage of the available storage space for the storage section; and

purging means, responsive to the determination that the threshold percentage is being exceeded for a section, for purging at least some file folders within the section;

wherein the purging reduces the total thickness for all file folders below the threshold percentage.

9. A system for managing file folders in file storage facility as recited in claim 3, wherein the means for determining is a physical measurement of the files in a storage section.

11. A system for managing file folders in a file storage facility as recited in claim 10, wherein the computer algorithm for purging is based on content information for the file folders in a storage section.

12. A system for managing file folders in a file storage facility as recited in claim 10, wherein the computer algorithm for purging is based on file usage history for the file folders in a storage section.

13. A system for managing file folders in a file storage facility as recited in claim 10, wherein the computer algorithm for purging is based on physical size for the file folders in a storage section.

14. A system for managing file folders in a file storage facility as recited in claim 10, wherein the computer algorithm for purging is applied to each storage

section independently of the other of said plurality of storage sections.

16. A system for managing file folders in a file storage facility as recited in claim 10, wherein the computer algorithm for purging is for determining which files are least likely to be requested compared with other files in a storage section.

17. A system for managing file folders in a file storage facility as recited in claim 10, wherein the computer algorithm for purging is for determining firstly which files are least likely to be requested independently of other files in a storage section and secondly which files are least likely to be requested compared with other files in the storage section.

18. A system for managing file folders in file storage facility as recited in claim 2, wherein the purging means includes purge list generating means for periodically generating a list of files that may be purged from the storage sections and printing means for printing out the list of files for purging.

24. A system for managing the storage of medical record files in a file storage facility including a set of shelves, divided into sections, for the medical record files, comprising,

a shelf database for storing information corresponding to each shelf section in the file storage facility utilized for storing the medical record files, including at least a unique shelf section identification code for the each shelf section, an indication of the linear dimension of the shelf section, and an indication of the current fullness of said shelf section;

a file database for storing information corresponding to each medical record file including at least a file identifier, the current thickness of the file, and the shelf section location for the file;

means for updating the current thickness for a file in the database when the thickness of a file changes;

means for determining the current fullness of the shelf section by comparing the linear dimension of the shelf section with total thickness of all files stored on the shelf;

means for determining when the current fullness of the shelf section exceeds a threshold value;

a file usage algorithm for determining which files are least likely to be requested;

means for generating a list of files that may be removed from a shelf section according to said file usage algorithm to reduce the current fullness of the shelf section below the threshold value;

wherein the current fullness for each shelf in the file storage facility is maintained within a specified fullness range.

[First Hit](#) [Fwd Refs](#)☐ [Generate Collection](#) [Print](#)

L18: Entry 5 of 7

File: USPT

Jul 10, 2001

US-PAT-NO: 6260049

DOCUMENT-IDENTIFIER: US 6260049 B1

TITLE: Automated shelf management system and process for tracking and purging file folders in a file storage facility

DATE-ISSUED: July 10, 2001

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APPL-NO: 09/ 189772 [\[PALM\]](#)

DATE FILED: November 10, 1998

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US-CL-ISSUED: 707/104; 209/547, 340/572.1, 283/81

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FIELD-OF-SEARCH: 209/547, 340/572.1, 283/81, 707/104

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

[Search Selected](#) [Search ALL](#) [Clear](#)

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5159180	October 1992	Feiler	235/375
<input type="checkbox"/>	5287414	February 1994	Foster	382/1
<input type="checkbox"/>	5424858	June 1995	Gillotte	359/143
<input type="checkbox"/>	5936527	August 1999	Issacman et al.	340/572.1

OTHER PUBLICATIONS

Barbara D. Volkov, "Labor Cost Comparison: Application of Individual `Sticky` Labels vs. Application of an 8 Inch `Strip` Label for End Tab File Folders," White Paper, Oct., 1997, Five Pages.

ART-UNIT: 217

PRIMARY-EXAMINER: Kulik; Paul V.

ATTY-AGENT-FIRM: Milik; Kenneth L.

ABSTRACT:

An automated system and process for managing paper files, particularly medical records contained in file folders and the like, in a file storage system having a predetermined size or limited expansion capacity. A shelf manager system includes a computer program and database which tracks the thickness of individual file folders, the capacity of storage shelf sections, and the percentage of free space remaining in each shelf section. The thickness of each file folder is measured whenever the file folder enters or leaves the primary file storage facility. File folder thickness is computed by weighing the file on an electronic scale or other caliper-based measure device. When occupied shelf space exceeds a threshold percentage for a shelf section, file folders are purged according to the likelihood that certain files will not be requested in the future by applying purging algorithms to the individual files. In an alternative embodiment, document image scanning provides multiple copies of pertinent file information to fulfill multiple pending file requests. In another alternative embodiment, the file folders include radio frequency identification tags for passive detection of file folder identification. In a still further alternative embodiment, data from the shelf manager system controls a digital printing press to create direct print color-coded file folders for use with the shelf manager system.

24 Claims, 58 Drawing figures

First Hit Fwd Refs**End of Result Set**

Generate Collection

Print

L20: Entry 5 of 5

File: USPT

Jan 22, 2002

DOCUMENT-IDENTIFIER: US 6341287 B1

TITLE: Integrated change management unit

Abstract Text (1):

An integrated system for managing changes in regulatory and non-regulatory requirements for business activities at an industrial or commercial facility. Application of this system to environmental, health and safety activities, and to food, drug, cosmetic, and medical treatment and device activities, are discussed as examples. The system: provides one or more databases that contain information on operations and requirements concerning an activity or area of business; receives information on regulatory and non-regulatory changes that affect operations of the business; converts these changes into changes in data entry forms, data processing and analysis procedures, and presentation (by printing, electronic display and/or distribution) of data processing and analysis results to selected recipients, without requiring the services of one or more programmers to re-key and/or reformat the items affected by the change; and implements receipt of change information and dissemination of data processing and analysis results using the facilities of the Internet.

Brief Summary Text (4):

Control of industrial and commercial activities by means of federal, state and local laws, statutes, ordinances and regulations ("regulations" herein) is endemic in the United States. Examples of activities that are regulated by such regulations include: environmental health and safety ("EH&S"; Titles 7, 10, 29, 30, 40, 42 and 49 of the Code of Federal Regulations and related state and local codes); administrative procedures applicable to government personnel (Title 5); agricultural activities (Titles 7 and 9); creation, use, treatment and disposal of nuclear materials (Title 10); conversion and distribution of usable forms of energy, power and water (Titles 10 and 18); banking, financial and securities activities and foreign trade (Titles 12, 15, 16, 19 and 22); space and aeronautical activities (Title 14); commercial trade practices (Title 16); food, drugs, cosmetics, medical treatments and devices ("FDCMTD"; Title 21); transportation of persons and cargo (Titles 23 and 49); housing and urban development (Title 24); firearms production and trade (Title 27); workers compensation (Title 29); mining and related activities (Title 30); national defense activities (Titles 15 and 32); navigation and navigable waters (Title 33); education (Title 34); activities in and on parks, forests, public lands and other public property (Titles 36 and 43); intellectual property activities (Title 37); veterans' pensions and relief (Title 38); postal service activities (Title 39); public contracts and public property management (Titles 41 and 48); public health (Title 42); emergency management and assistance (Title 44); grant of public welfare and assistance (Title 45); telecommunications (Title 47); and wildlife and fisheries activities (Title 50). Some of the most pervasive regulations concern EH&S and FDCMTD activities.

Brief Summary Text (22):

Sections 301-303 of Title III enacted the requirement for Emergency Response Planning. Emergency Response Planning as enacted by SARA required the creation of committees at both State (State Emergency Response Committee, or S.E.R.C.) and

Local (Local Emergency Planning Committee, or L.E.P.C.) levels. Owner/operators of facilities with specified hazardous substances on site in quantities in excess of specified thresholds are required to prepare and submit Emergency Response Plans to the L.E.P.C. having jurisdiction over the facility. Elements of the facility Emergency Response Plan include: (1) identification of Emergency Response procedures to be used for action on the site and for areas surrounding the site; (2) identification of a facility coordinator for implementing the plan; (3) procedures to be used during emergencies for notifying authorities and potentially affected parties; (4) methodology for determination when a release has occurred and the probable area and population at risk; and (5) description of Emergency Response assets that are in place as well as the contact point for the Emergency Response assets.

Brief Summary Text (23):

Section 304 of Title III requires preparation and filing of an Accidental Release Notification report whenever an accidental release of a specified hazardous substance occurs in which (1) the substance crosses the facility boundaries or is released in transport on public roads, and (2) the release amount exceeds specified thresholds. This report must address: (1) actions taken to contain or respond to the release; (2) any known or anticipated acute or chronic health risks associated with the release; and (3) advice regarding medical attention required for any exposed individuals.

Brief Summary Text (24):

Section 311 and 312 of Title III provide for facility hazardous substance inventory reporting. Facility hazardous substance inventory reporting is required if substances for which an MSDS is required under OSHA are present in quantities in excess of specified thresholds. Facilities subject to hazardous substances inventory reporting requirements must: (1) produce a listing of specified hazardous substances present at the facility or an MSDS for each specified hazardous substance; and (2) an emergency and hazardous chemicals inventory report form. Both reports (listing/MSDS and inventory report) must be submitted to the following agencies: (1) L.E.P.C.; (2) S.E.R.C.; and (3) local Fire department.

Brief Summary Text (25):

Section 313 of Title III requires the E.P.A. to establish an inventory of toxic chemical emissions from certain facilities. To do so, the E.P.A. requires owners and operators of facilities that manufacture, import, process, or use specified toxic chemicals to report annually their releases of those chemicals to any environmental media. Releases to air, water, and land, and releases to off-site locations such as publicly owned treatment works or hazardous waste disposal sites, must be estimated and reported under Section 313. Both routine and accidental releases must be reported. Facilities must report even if their releases comply with all environmental laws and permits.

Brief Summary Text (29):

What is needed is an integrated change management system for a selected area of commercial or industrial activity that: (1) provides one or more databases having all relevant available information, including knowledge of regulatory and non-regulatory information and changes, used in connection with the activity; (2) facilitates sharing of this information between databases; (3) generates and archives records of software system versions used for data entry, reporting, processing, analysis and results presentation, and changes to these versions; (4) generates all documents and reports required for compliance under applicable regulations, laws and statutes; (5) provides screen images, and appropriate changes to these images, that implement data entry, processing, analysis, reporting and results presentation; and (6) allows entry of the changes and modification of the affected data entry forms, report forms, views, screen images, functions, processes and formulas, without requiring (re)programming of the underlying software.

Detailed Description Text (21):

Each of the four layers is discussed in more detail in the following sections.

Detailed Description Text (25):

The metadata architecture is created using Oracle or a similar database system. The metadata model has two main components, a business content data dictionary and an application component. The data dictionary describes or defines the data elements of the application system and the business content layer and how a data element is recorded and managed at the database management system (DBMS) level. The application component primarily records procedures for manipulating business information using data entry forms, worklists, processes, documents, reports and business logic.

Detailed Description Text (35):

The calculation profile variable table 71 records the calculation profile variables. The column table 72 records the data elements of every table recorded in the table 69. The output group property table 73 maintains the details of the application table columns. The module event trigger table 74 provides the event triggers specified for modules in the system. The module event trigger step table 75 provides the event trigger steps specified for modules in the system. The output template table 76 provides the document template details.

Detailed Description Text (36):

With reference to FIG. 3, the constraint column table 81 provides individual data elements for the business rules. The constraint table 82 provides the business rules defined at the database level for every table in the application system, together with the meaning of each rule. The column table 72 is characterized in the preceding. The column allowable value table 83 provides the business rules at a data element level. The autofill table 84 records the automatic data transfer setup. The arc column table 85 provides data elements that are part of every usually exclusive relationship in the system. The arc table 86 records the mutually exclusive relationships in the system. The lookup table 87 provides the lookup definitions for every child table in the system. The tablename table 69 is characterized in the preceding. The object table 88 holds the names of the database objects defined in the system. The about table 89 stores versions of, and copyright information concerning, the system. The datatype table 90 provides the datatype definitions throughout the system. The dependency tree table 91 provides the application and database hierarchy(ies). The color table 92 provides the color definitions for use in various tools.

Detailed Description Text (146):

4. Copy Record implements copying data from one record to another. A user can create multiple copies and can copy a record from a child record by selecting the relevant table(s) and column(s) to be copied.

Detailed Description Text (148):

6. Find Data implements finding of one or more records based on parent-child relationships. A user can search for and view a record by entering an "or like" condition for any column in any parent or child table.

Detailed Description Text (149):

7. Calculate Record attaches pre-defined mathematical formula(s) to a form and calculation of results using the formula(s). A user can map formula arguments (variables, parameters) to tables and columns in a database, read in transaction data imported from external systems, set up data profiles to reduce data entry, and enable creation of new records based on calculated results. Results can be graphed, printed or transmitted by e-mail and facsimile.

Detailed Description Text (151):

9. Grid Data Entry implements querying and editing of records in a grid or

spreadsheet-style interface. A user can transmit grid data by e-mail and facsimile.

Detailed Description Text (153):

C. Report implements viewing, printing and transmitting data based on pre-defined business requirements. Data are provided to a user in the most useful format for that user. A data report can be in tabular format, with column(s) displayed horizontally, in columnar format, with data displayed vertically, or in document format, with data inserted on top of, or associated with, regulatory form images. Indeed, this association is a key feature of the invention. A report function includes the following features.

Detailed Description Text (176):

D. Copy implements copying of one or more records within a table. A user can create single or multiple copies and copy data from child records by selecting relevant tables and columns to be copied.

Detailed Description Text (183):

3. Item Properties allows a user to change field level (as distinguished from form level) properties. A user can change the field label, display width, sequence, list of values, lookup form (a form that is edited for a foreign key column) and other relevant properties.

Detailed Description Text (213):

In the EH&S area, for example, the business content layer in one embodiment may include seven sections that communicate with each other through a mechanism that integrates these sections:

Detailed Description Text (232):

A similar integrated set of sections can be developed in any of the other regulated areas to which one or more of the Codes of Federal Regulations applies, or selected areas of non-regulatory change in a business activity. The system uses the four interacting software layers (change, Java data management, metadata and business content), discussed in the preceding, and may include an array of pre-defined document forms, report forms, data entry forms, formulas and calculations that are most likely to be needed in that business activity. These pre-defined forms and analytical procedures are changed or supplemented to meet the relevant regulatory and non-regulatory changes that are identified by one or more Intelligent Agents that reside on a network, such as the Internet, and that are identified and entered manually by individual users. System functionality can be extended by importing related analytical techniques, such as geographic information systems capability, and by use of internet links to expand the flexibility of the system.

Detailed Description Text (233):

An EH&S system that implements the invention in one embodiment includes eight sections, illustrated in an example shown in FIGS. 8-19. Each E&S section has several functional modules that are responsible for different activities associated with tracking and creating reports on related activities and for providing links between the different modules in the same section and/or in another section. The sections and the input data and output data for these sections are as follows.

Detailed Description Text (385):

The Product Stewardship section includes databases that provide relevant information on chemical and physical properties of materials used at a facility, product handling information, ordinary and special hazards associated with a material consumed, processed and/or produced at the facility, and environmental health and safety (EH&S) assessments. This section can create a Materials Safety Data Sheet (MSDS) in a plurality of languages, using pre-set phrases linked to the EH&S assessments, and the MSDS can be distributed to selected recipients using the system's MSDS distribution system (facsimile, e-mail, hard copy, etc.). This

section permits a user to perform life cycle analyses on selected materials. MSDS image files can be created and stored within the system and/or can be converted to an ANSI standard 16-section format for HAZCOM viewing. A user can also create HAZCOM warning labels that comply with NFPA and HMIS requirements. This section also tracks material imports and exports, as well as pre-manufacture notifications, ecology-toxicity studies, allegations received concerning discharges, and inquiries concerning manufactured chemicals. This section also provides for pesticide reporting under FIFRA.

Detailed Description Text (386):

The Incident Tracking and Prevention section captures and accumulates information on all environmental releases and discharges and all injuries and illnesses at the facility. This section includes a listing of incident command structures, listings of qualified emergency response personnel, responsibilities for emergency responders and emergency procedures, including checklists. This section identifies hazards associated with, and emergency response information for, materials that may be released. A Geographic Information System (GIS) tool is included that can be used to graphically display incident information, locations of nearby toxic, reactive, ignitable and/or corrosive chemicals and of the closest emergency response equipment. This section provides agency reportability determination for SARA and CERCLA releases and provides follow-up notifications for the appropriate agencies. Associated statistical tools allow statistical analysis of incidents to identify possible trends. Environmental releases, permit excursions, injuries and illnesses at the facility can be accumulated for a selected division or facility or for an entire enterprise to create reports for SARA, OSHA and internal reporting requirements. Incidents that result in workers compensation issues and/or in risk management issues can also be identified and tracked.

Detailed Description Text (387):

The Personnel Health and Safety section is the main repository of employee information and allows scheduling, monitoring and tracking of events involving industrial hygiene, safety and/or occupational medicine. All types of industrial health surveys are supported, including chemical, noise, heat stress, radiation and ergonomics. Results of occupational medicine examinations, including physical exams, health history questionnaires, respirator fit tests, EKG exams, audiometric exams, pulmonary function tests, vision tests, x-ray exams and drug screening, can be accumulated and analyzed. This section captures and accumulates employee demographics, primary and secondary job classifications, job activities, and employment histories. This section is integrated with other sections to create process surveys and analysis plans for exposure groups that can be selected by industrial hygiene and safety personnel. This section aids in identification of training needs associated with a job, a location or a regulatory requirement. Groups of persons that need particular training can be identified, and content of appropriate training courses and follow-up courses can be determined. Costs associated with all examinations and training activities can be captured and examined.

Detailed Description Text (388):

The Hazardous Materials and Waste section tracks a material's arrival at the facility, the maximum quantity stored, distribution and use of material at the facility, movement, and consumption and disposal of material at the facility. Material tracking provides information to support SARA notifications and release reporting and allows a user to generate waste profiles, hazardous waste manifests and related DOT shipping information. This section maintains a library of previous manifests, tracks the status of manifest copies, and captures and notes discrepancies and modifications, if any, vis-a-vis an earlier manifest. The manifest information, once created, is rolled up to produce RCRA state and federal waste summary reports. This section also provides for authorization, stocking, inventorying and reordering of material to ensure that required materials are always available. Pollution prevention projects, source reductions, waste

minimization and waste tracking against user goals can be implemented within this section to meet internal and/or external targets. The section provides mass and energy balance tracking for selected processes and/or selected equipment.

Detailed Description Text (389):

The Environmental Release section captures necessary data to create agency reports of releases to air, water or other liquids, and land. Air release information can be captured for Title V requirements, risk management plans, air emissions inventory summaries, and leak detection and repair programs. This section captures multimedia permit requirements for air, effluent discharges, stormwater, water quality and waste facility permits. Permit dates and imposed conditions can be monitored using automatic screen alerts or e-mail messages. Tracking of calibration events, samples, analysis requests and laboratory reports are implementable within this section.

Detailed Description Text (390):

The Regulatory Requirements section provides additional tools that are useful in implementing and managing EH&S compliance, including identification of all internal and external requirements in order that the facility be allowed to operate. This section also identifies who is responsible for compliance with a particular requirement. This section can be used to determine if, and how, proposed regulations will affect facility operations by providing access to material, equipment and process information to which the regulations may be applied. Reference information, such as checklists and current regulations, are available through this section or by use of links to its Internet data sources. Compliance documents, interpretations, procedures and work plans can be stored and shared with all affected persons and organizational units. The status of work plans, tasks and activities can be tracked and reported. Audit scheduling, audit findings and corrective actions scheduled and implemented can be identified and reported to provide feedback on the effectiveness of the facility's compliance program. This section provides an effective tool for designing and implementing an ISO 14000 compliance program for a facility.

Detailed Description Text (391):

The Facilities Management section is a cross-functional sub-system that maintains site-specific and enterprise data. This section captures geographic information, organizational structures, equipment specifications, operating information, calibration requirements, maintenance schedules, vendor information and user-defined checklists. This section also captures relevant process information and data, site disposal activities, products manufactured, unit operations, and simulation of process scenarios and recipe information. A user can profile land use wildlife resources and cultural resources present, and sensitivity of selected receptors. This information can be presented spatially, if desired, using the GIS capability.

Detailed Description Text (393):

In summary, the system accepts new data and forms and changes to existing data and forms, determines links of each entered data item to one or more of the sections and modules within a section, adds the data item to, or uses the data item to upgrade an extant data item within, one or more modules, and implements any quantitative or qualitative changes that should be made in the remainder of the system as a result of entry of the data item.

Detailed Description Text (398):

This "thin client" approach allows the combined server/client system to take advantage of the separate strengths of the server (simple and/or complex database structures, use of on-line transaction processing tools) and of the client (use of GUI, Windows and Windows applications) without requiring unnecessary duplication of these capabilities. After the user has disconnected from the server, no server programs remain on the user's terminal. This approach requires only modest user

terminal capabilities (20 Mbytes of hard drive space, 8 Mbytes of RAM, a PC or Macintosh or Sun terminal with a mouse, Netscape Navigator 4.1+ or Internet Explorer 4+) and TCP/IP communications capability. The server or host terminal provides all of the database capability and most of the processing power and preferably includes a database structure such as Oracle 7.3+, 2 Gbytes of hard drive space, 256 Mbytes of RAM and TCP/IP capability.

Detailed Description Text (406):

A "foreign key column" is a column whose data source is a parent primary key column.

Field of Search Class/SubClass (2):

707/200

CLAIMS:

1. A system for monitoring processing and disposition of at least one material used in a business at a facility, the system comprising:

a first database that provides product stewardship for at least one selected material that is received, created, consumed or produced as a waste product at the facility, the first data base including information on at least one product produced at the facility, information on ecological and toxicological studies performed at the facility, information for production of a Materials Safety Data Sheet (MSDS) for at least one material used at the facility, and tracking of allegations and inquiries concerning operations at the facility; and

at least one additional database, drawn from the following group of databases:

a second database that allows tracking and prevention of selected incidents involving unintended discharge of a material at the facility, the second database including information on response to at least one type of emergency at the facility, information on tracking of at least one incident at the facility, and safety information on at least one process used at the facility;

a third database that provides information on and monitoring of personnel health and safety at the facility, the third database including information on demographics of personnel working at the facility, information on personnel training, information on safety measures implemented at the facility, injuries and illnesses experienced by at least one worker at the facility, and information on industrial hygiene and occupational medicine studies carried out at the facility;

a fourth database that provides information on and monitoring of hazardous materials and hazardous waste, the fourth database including information on at least one hazardous material used at the facility, tracking of at least one waste material produced at the facility, information on at pollution prevention measures and on site remediation measures implemented at the facility;

a fifth database that tracks a controlled release or discharge of a material to the environment, the fifth database including information on discharge of at least one hazardous substance into at least one of the air, the water, the groundwater and the soil at the facility, and information on at least one toxic chemical release at the facility;

a sixth database that provides selected information on regulatory requirements for receiving, handling, processing or producing hazardous materials, the sixth database including information on at least one environmental audit conducted at the facility, information on regulatory lists used at, and on regulatory issues concerning, the facility, and information on at least litigation issue concerning the facility; and

a seventh database that provides selected information on management of the facility, the seventh database including information on at least one of the physical structure and the organizational structure at the facility, information on tracking of at least one equipment item at the facility, and information on at least one process used at the facility;

a tools module that provides software for at least one of creation of a report on operations at the facility, creation of formulas and expressions for a report on operations, creation of at least one image for a report on operations, archiving of at least one record on operations, and security measures implemented at the facility, and that implements entry of one or more changes in regulatory and non-regulatory requirements for the business without requiring manual reprogramming of the tools module software; and

a relational database management module that links each database to each other database and to the tools module so that an information item, once entered, becomes available to each database and to the tools module.